Parametric Costing (Demand Level)

For more information, see the

DOD Parametric Cost Estimating Handbook, Second Edition

(http://www.dcmc.hq.dla.mil/dcmc_o/cbo/guide/cover.htm)

Parametric Estimating

- **A technique employing one or more Cost Estimating Relationships (CERs) and associated mathematical relationships and logic.**
  - The technique is used to measure and/or estimate the cost associated with the development, manufacture, or modification of a specified end item.
  - The measurement is based on the technical, physical, or other end item characteristics.

Parametric Cost Model

- **A parametric cost model is a group of cost estimating relationships used together to estimate entire cost proposals or significant portions thereof.**
  - These models are often computerized and may include many inter-related CER's, both cost-to-cost and cost-to-noncost.
  - Some models use a very limited number of independently estimated values and a series of Parametric inter-related cost-to-cost and cost-to-noncost estimating relationships to predict complex proposal cost structures.

Hardware Cost Modeling

- Estimates system acquisition costs based upon:
  - Quantitative parameters such as complexity, quantity, weight, and size; and
  - Qualitative parameters such as environmental specification, type of packaging, and level of integration; and schedule parameters such as months to first prototype, manufacturing rate, and amount of new design.
  - Electronic hardware items are characterized by the electronic application and type of componentry.
  - Mechanical and structural elements can be described in terms of their construction, type of material, functionality, machinability, and manufacturing process.
- Parametric cost models have been developed to operate with limited concept description so that many alternatives can be costed before designs and bills of material are finalized (trade-off analysis).

Estimating Cost of a Wing

- **CER Ratio: Cost per sq.ft. of surface area**
- **Basic Cost of $100,000 plus CER of $3,500 per square foot**
- **Calculation of a 200 square foot wing**

200 sq. ft. x $3,500 =	$700,000
Basic Cost	100,000
Total Estimate	$800,000

Software Cost Modeling

- The use of two or more software estimating tools using different methodologies is recommended.
  - A primary tool for software estimating and
  - An alternate tool for comparison and validation.
- Significant adjustments may have to be made to historical parametric cost data.
  - Consistent Scope
  - Anomalies
  - Improved Technology

Tools and Models Currently Used by DoD

- Activity Based Costing-ABC
- Army Manpower Cost System-AMCOS
- ASC Cost Workstation-CWS
- Automated Cost Estimating Integrated Tools-ACEIT
- Base Tempo Management Model
- Black Box Estimator-BBEST
- Compensation, Accessions, and Personnel Management-CAPM
- Cost-Oriented Resource Estimating Model-CORE
- COSTMODELER - The NASA Software Cost Estimation Program-CM
- Crystal Ball
- Depot Maintenance Resource Predictive Model-DMRPM
- Environmental Cost Engineering System-ENVEST
- FINITE
- Flex+
- Focal Plane Array Model-FPAM
- Force and Support Infrastructure Costing System-FSC System
- Forces/Organizational Cost Estimating System-FORCES
- Functional Economic Analysis Model-FEAM
- GORGO
- Launch Vehicle Cost Model-LVCM
- LCurve
- Logistics Support Cost Model-LSC
- Missile Development Cost Model (Formerly RDT&E IV)-MISLDEV
- Munitions Failure Model-MUNMOD
- Naval Air Systems Command (NAVAIR) Cost Model-NAVAIR Cost Model
- Naval Air Systems Command Learn Program-LEARN
- Naval Air Systems Command Rate Program-RATE
- NWC Missile Life Cycle Cost Model-MLCCM
- OSD(PA&E) Automated Information Systems Benefits/Cost Model-AIS Benefit/Cost
- Parametric Review of Information for Costing and Evaluation of Hardware-PRICE H
- Parametric Review of Information for Costing and Evaluation of Hardware Life Cycle-PRICE HL
- Parametric Review of Information for Costing and Evaluation of Microcircuits-PRICE M
- Parametric Review of Information for Costing and Evaluation of Software-PRICE S
- PC-Economic Analysis Package-PC-ECONPACK
- Performance Analyzer-PA
- Post Retirement Benefits Other Than Pension Cost Model-PRB Cost Model
- Programmed Interactive Cost Estimating System-PICES
- Radar Development Cost Model-RADARDEV
- Radar Engineering and Cost Tool-REACT
- RDT&E IV Tactical Missile Model-RDTEIV
- Revised Version of Intermediate COCOMO-REVIC
- Risk Analysis and Simulation Add-in for Microsoft Excel-@RISK
- Selected Essential Item Stockage for Availability Method-SESAME
- Software Architecture Sizing and Estimating Tool-SASET
- Spacecraft Cost Model Upgrade-SCM Upgrade
- Special Operations Force Cost Model-SOFCOST
- Summary Version Life Cycle Cost Model-SVLCCM
- System Evaluation & Estimation of Resources Hardware Estimation Model-SEER-H
- System Evaluation & Estimation of Resources SW Estimation Model-SEER-SEM
- Systematic Approach for Better Long Range Estimating-SABLE
- Systems/Trades Analysis Cost Model-STACM
- Unmanned Space Vehicle Cost Model 6th Edition-USCM6

Acceptability of Parametrics

- Cost estimating methodologies are acceptable when the following criteria exist:
  - Logical relationships,
  - Verifiable data,
  - Significant statistical relationship (correlation) exists,
  - Techniques produce accurate predictions, and
  - They are easy to monitor and support.

Adequacy: System & Controls

- The adequacy of the parametric cost estimating system and related internal controls needs to be considered, including:
  - Audit trail,
  - Sufficiency of documentation,
  - Currency and sources of data,
  - Procedures for calibration and validation, and
  - Appropriateness of parametrics use.
- Since historical data is normally used as the basis for all estimating, basic auditing techniques should be used to verify that costs are current, accurate, and complete.

Considerations

- Review the program inputs to the model.
- Review the technical inputs to the model.
- Understand the model's cost drivers.
- Question how the future environment might be different from the historical case.
- Is the estimated program expected to push the state of the technology (state of the art)?

Parametric Costing (Demand Level)

- DCMC Engineering Role
  - Use current price models, as required
    - Estimate the quantitative and qualitative parameters needed to use the models
  - Understand the cost drivers
  - Understand the use of current models in relation to their historical factors and the product's future environment
  - Verify that logical and significant statistical relationships exist
  - Review program and technical inputs